WHAT IS CLAIMED

1. For use with a digital communication system in which a terminal serving a plurality of circuits, from which requests for transmission of one or more digital information packets awaiting transmission over a serialized data path may be supplied, a method of controllably interfacing packets awaiting transmission from ports associated with said plurality of circuits with said serialized data path, said method comprising the steps of:

(a) providing a binary decision tree-based transmission assignment network having a root node associated with said serialized data path, a plurality of leaf nodes associated with respective ports of said plurality of circuits, and intermediate branch nodes that define a binary decision tree-structure between said root node and said plurality of leaf nodes;

(b) storing for each node of said network, other than said leaf nodes, a pointer to whichever of its two adjacent downstream nodes effectively points to a leaf node whose associated circuit currently has highest transmission priority, thereby providing said root node with a pointer to the circuit currently having highest transmission priority; and

(c) coupling, to said serialized data path, a packet from the circuit whose leaf node is pointed to by said root node.

2. The method according to claim 1, further including the step of:

(d) recalculating transmission priority and updating the pointers of said binary decision tree-based transmission assignment network stored in step (b), in accordance with whichever leaf node's associated circuit has highest transmission priority as a result of the execution of step (c).

3. For use with a digital communication system in which a terminal serving a plurality of circuits, from which requests for transmission over a serialized data path may be supplied of one or more digital information packets, a method of controllably interfacing packets awaiting transmission from communication ports associated with said plurality of circuits with said serialized data path, said method comprising the steps of:

(a) providing a binary decision tree-based transmission assignment network having N+1 sets of nodes containing $2^{N+1}-1$ nodes that define a binary decision tree-structure between a first port adapted to be coupled to said serialized data path, and 2^N communication ports, that are adapted to be coupled to said plurality of communication circuits, wherein 2^N is equal to or greater than the number of said communication circuits, said N+1 sets of nodes including a first, root node associated with said first port and 2^N leaf nodes, respectively associated with said 2^N communication ports, a respective

ith set of nodes comprising 2^{i-1} nodes, wherein i is greater than or equal to 1, and less than or equal to N+1;

(b) storing, for each of said 2^N leaf nodes of said network, first information representative of priority of transmission of a packet that may be awaiting transmission from an associated communication port over said serialized data path;

(c) storing, for a respective node of an ith set of nodes, a pointer to that node of an (i+1)th set of nodes that is associated with a leaf node having a relatively higher transmission priority; and

(d) coupling, to said serialized data path, a packet from the circuit whose leaf node is pointed to by said root node.

4. The method according to claim 3, further including the step (e) of recalulating the transmission priority of the leaf node for which a packet was coupled to said serialized data path in step (d), and updating the pointers of said binary decision tree-based transmission assignment network.

5. A communications controller for a digital communication network having a serialized digital communication link, through which a network coupled to a first end of the link may transmit and receive digital telecommunication packets with respect to a plurality of

communication ports associated with customer premises equipments served by a remote termination site at an opposite end of the link, said communications controller being installable in said remote termination site and being operative to execute a packet transmission control mechanism for handling packet transmission requests from virtual circuits coupled with said plurality of communication ports and associated with said customer equipments, and thereby selectively granting transmission to a packet over said serialized digital communication link by executing the following steps:

(a) providing a binary decision tree-based transmission assignment network having N+1 sets of nodes containing $2^{N+1}-1$ nodes that define a binary decision tree-structure between a first node associated with a port adapted to be coupled to said serialized digital communication link, and 2^N leaf nodes respective ones of which are associated with respective ones of said communication ports, wherein 2^N is equal to or greater than the number of communication ports, said N+1 sets of nodes including a first, root node associated with said first port, a respective ith set of nodes comprising 2^{i-1} nodes, wherein i is greater than or equal to 1, and less than or equal to N+1;

(b) storing, for each of said 2^N leaf nodes of said network, first information representative of priority of transmission of a packet that may be awaiting transmission from an associated communication port over

said serialized digital communication link;

(c) storing, for a respective node of an ith set of nodes, a pointer to that node of an (i+1)th set of nodes that is associated with a leaf node having a relatively higher transmission priority; and

(d) coupling, to said serialized digital communication link, a packet from the circuit whose leaf node is pointed to by said root node.

6. The communications controller according to claim 5, wherein said communication controller is further operative to recalulate the transmission priority of the leaf node for which a packet was coupled to said serialized digital communication link in step (d), and updating the pointers of said binary decision tree-based transmission assignment network.